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The Chief of Bureau visited Minot, North Dakota in January in connection with the preparation of plans and specifications for engineering works being designed for migratory waterfowl refuges of the Bureau of Biological Survey; conferred with D. L. Yarnell at Minneapolis, concerning the preparation of graphs of precipitation data for publication; and discussed with C.W. Okey at Chicago the conduct of surveys he is undertaking for migratory bird refuges in the Central Mississippi Valley.

W. W. McLaughlin was one of a committee of three appointed by the Association of Western State Engineers at their Salt Lake meeting December 7 to draft a proposed uniform underground water law for the Western States, others on the committee being Thomas M. McClure, State Engineer of New Mexico, and William Peterson, Director of Extension, Utah Agricultural College. A preliminary draft of the proposed law has been circulated among State Engineers of the Western States for comment or suggestion. The fundamental principle underlying this proposed law is that the waters of underground streams, channels, artesian basins, reservoirs, lakes, or other bodies of underground water moving in a definite lateral direction, having boundaries scientifically ascertainable, are declared to be public waters and to belong to the public and to be subject to appropriation for beneficial use under the terms of the act and not otherwise. Beneficial use is made the basis, the measure, and the limit to the right to the use of such waters.

A paper on "Orchard Tillage under Straight Furrow Irrigation" was presented by Colin A. Taylor at the meeting of the Pacific Coast Section of the American Society of Agricultural Engineers held at Corvallis, Oregon, December 28.

A new evaporation station, capable of more extended investigations than have been carried on heretofore by the Division of Irrigation in southern California, was established by A.A. Young at the Fullerton airport, Orange County, California. It is expected at this station to determine ratios of evaporation from several different pans based upon the evaporation from a pan 12 feet in diameter. Assuming that the loss from the 12-foot pan is similar to that from a lake or reservoir, losses from smaller pans may be reduced directly to reservoir loss. The absence of freezing weather, the 12-month period of evaporation, the proximity to the Pacific Ocean and the coastal fogs, and the scarcity of the water supply in the Pacific Southwest all tend to increase the importance of an evaporation study in this locality.

M. R. Lewis made a trip over eastern Oregon to outline a drought-relief program looking toward the construction of a number of small dams for the conservation of water. Most of the proposed dams would be constructed on the public domain or on Forest Reserves and would be for the purpose of

storing small quantities of water for stock-watering purposes. The relief program during the past several months in the development of springs and wells has been of very great assistance to the livestock interests of the State. There are, however, areas where neither wells nor springs can be developed and in these areas it is proposed to build stock-water reservoirs. In a few cases it is proposed to build small dams which will store water for supplemental irrigation for small communities.

A paper on "Soil Moisture Requirements of Pear Trees" was delivered by R. A. Work at the Forty-ninth Annual Meeting of the Oregon State Horticultural Society at Hood River, Oreg., December 10.

Upon request of the Texas Board of Water Engineers, Harry G. Nickle prepared a brief report presenting silt records gathered at the Waco and Rosenberg-Richmond stations on the Brazos River, Tex., for possible use of the Board at hearings in Washington on the Brazos project, involving the question of maximum and average rates of erosion of silt from certain small watersheds in the Brazos River.

As Secretary of the Idaho Emergency Drought Relief Committee, J. C. Marr aided in the preparation of the Committee's progress report. Upon request of the Idaho Planning Board, he also assembled all the information procurable on the soils of Idaho.

At the request of the Emergency Relief Administration for an opinion regarding certain phases of the proposed El Dorado County, Calif., Zoning and Conservation Project, Paul A. Ewing, Wells A. Hutchins, and A. T. Mitchellson visited the project and prepared a report. The plan involves a forest, industrial, and agricultural area, and provides for the rehabilitation of an old irrigation system to serve a community of industrial farms.

According to R.R. Drake the annual rainfall at Hays, Kans. was 16.26 inches for the year 1933 and 16.06 inches for 1934. This compared with an average annual rainfall of 22.88 inches for the 74-year period, 1860 to 1934 inclusive. Practically all of the 1934 precipitation occurred in the form of light sprinkles or torrential downpours and was of little benefit to crops. The summer temperatures were the highest ever recorded in this locality for the period 1907 to 1934. The combination of these adverse conditions made 1934 the least productive year in local farming experience.

A paper outlining results from engineering experiments at the soil erosion experiment station operated in cooperation with the Washington State College at Pullman was presented by P. C. McGrew at the annual meeting of the Pacific Coast Section of the American Society of Agricultural Engineers in Corvallis, Oreg. on January 4 and 5.

F. E. Hardisty returned to the La Crosse station on January 12 from a period of leave. While absent from La Crosse he visited the erosion control work of the Tennessee Valley Authority at Knoxville, Tenn. and Auburn, Ala. He also inspected the experimental work conducted by the Bureau at Zanesville, Ohio, and the work of the Alabama Polytechnic Institute at Auburn, Alabama.

The completion of a ditch lining experiment at Zanesville is reported by V. D. Young. The experiment consists of a ditch divided into four sections with linings as follows: Section one has a sand base with a coating of tar sprinkled over top, then a layer of coarse rock and tar poured over top as binder; section two has gravel and sand mixed and put in place and then bound with tar sprinkled on top; section three has treatment similar to section two except that crushed rock is used in place of gravel; section four has gravel and sand mixed and this whole mixed with tar as mortar and tamped in place.

Two seed treaters, an automatic grain feeder, and a fungicide-feeding device have been constructed and are being tested at Arlington Farm, Va., in connection with the seed-treating project. Three commercial treaters are also being tested for accuracy of feed in applying fungicides. According to W. M. Hurst and W. R. Humphries, the greatest difficulties encountered have been in connection with the feeding of the fungicides. The materials most commonly used are in dust form and are difficult to feed mechanically at a constant rate. This work is being conducted in cooperation with the Bureau of Plant Industry.

In connection with the forage drying project E. D. Gordon reports that results of the feeding work done by the Bureaus of Animal Industry and Dairy Industry at Jeanerette, La., show that dairy cows fed a ration consisting of dehydrated alfalfa hay produce 100 pounds of milk at a feed cost of \$1.06 to \$1.43. Dairy calves at the age of 6 months, placed on a ration of dehydrated cowpeas, produced 100 pounds of gain at a cost of \$7.60. In comparing rations containing sun-cured and dehydrated soybean forage, it was found that the cost of forage per hundred pounds of gain was \$1.44 less for the ration containing the dehydrated soybeans.

J. W. Randolph reports that the cultivation of cotton in excess of that required for weed control resulted in a reduction in yield, over a three-year period, on a field at Prattville, Ala.

A machine for measuring the resistance of metal to wear has been constructed at Auburn, Ala. Results of preliminary tests indicate that a series of experiments will be necessary on samples of steel of known hardness for use as a guide in testing plow metals. This work is in cooperation with the Alabama Agricultural Experiment Station.

At the Toledo office a study is being made of methods for applying a finely atomized oil as a spray for control of pea aphids and other insects. This work carried on cooperatively with the Bureau of Entomology and Plant Quarantine office.

At Albany, Ga., E. M. Dieffenbach is determining the pattern of several low-pressure nozzles by use of the spray shutter. This shutter operates on the principle of a focal-plane camera shutter and will record a pattern up to 54 by 84 inches.

At Davis, Calif., work has been begun on a tractor-mounted planter-cultivator for use with bed-planted sugar beets, to replace the unwieldy sled planter now commonly used. The equipment is designed for use with small row crop tractors and will make possible the use of lower cost planting and cultivating units.

A number of hand rakes constructed by D. A. Isler in cooperation with the Bureau of Entomology and Plant Quarantine are being successfully used at Presidio, Texas, in the clean-up work to eliminate hand picking of debris.

On January 2 W. V. Hukill left for Yakima, Washington, from which point he will accompany a shipment of apples to New York and other eastern markets for the purpose of studying their preservation in transit. Weather permitting, he will return to Washington headquarters about January 31.

The following publications have been issued within the past month:

- Policies governing the ownership of return waters for irrigation.
By Wells A. Hutchins. Technical Bulletin 439.
- Cooling milk on the farm with small mechanical outfits.
By R. P. Hotis and J. R. McCalmont. Circ. 336
- A low-cutting sled corn cutter. By O. K. Hedden. Misc. Pub. 212.